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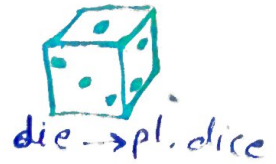
البيت

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[4] مأمرة

Example: In rolling a <sup>fair</sup> symmetric die,

$$S = \{1, 2, 3, 4, 5, 6\}$$



$$P(1) = P(2) = P(3) = P(4) = P(5) = P(6) = \frac{1}{6}$$

Example: A pair of fair dice is shown. Find the probability that the sum is 10 or greater if:

- 1) a 5 appears on the first die
- 2) a 5 appears on at least one of the dice

Solution

$$1) E_1 = \{(4, 6), (5, 5), (5, 6), (6, 4), (6, 5), (6, 6)\}$$

$$E_2 = \{(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)\}$$

$$E_3 = (E_1 \cap E_2) = \{(5, 5), (5, 6)\}$$

$$E_4 = (E_1 | E_2), P(E_4) = \frac{P(E_1 \cap E_2)}{P(E_2)}$$

$$= \frac{(\frac{1}{6} \cdot \frac{1}{6}) + (\frac{1}{6} \cdot \frac{1}{6})}{(\frac{1}{6} \cdot \frac{1}{6}) + \dots} = \frac{2/36}{6/36} = \frac{1}{3}$$

$$2) E_5 = \{(5,1), (5,2), (5,3), (5,4), (5,5), (5,6), \\ (1,5), (2,5), (3,5), (4,5), (5,5), (6,6)\}$$

$$E_1 \cap E_5 = \{(5,5), (5,6), (6,5)\}$$

$$E_6 = (E_1 | E_5)$$

$$P(E_6) = \frac{P(E_1 \cap E_5)}{P(E_5)} = \frac{3/36}{11/36} = \frac{3}{11}$$


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Stochastic (Random) variables :-

It is a real valued function  $X$  defined on the sample space  $S$ .

If it is defined on a discrete sample space, it is called a discrete Stochastic Variable.

If  $S$  is continuous, Then  $X$  is a continuous stochastic variable.